

Individual Lab Report

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Team Letter and Name: Team G, RoboGrapher

Teammates: Sida Wang

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Individual Progress

1. Get interest point of human face from IntraFace Software.

I learned the structure of Intraface software and learned how to read interest point positions from IntraFace Software. There are 49 interest points each image for human face.

Left eyebrow: 0 – 4

Right eyebrow: 5 – 9

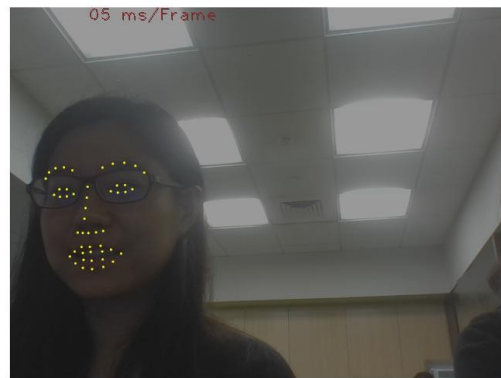
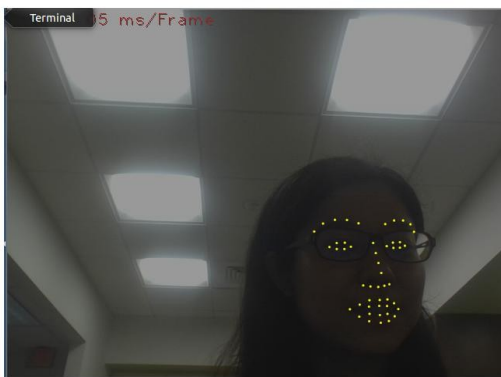
Nose: 10 – 13

Under Nose: 14 – 18

Left Eye: 19 – 24
Right Eye: 25 – 30
Mouth Contour: 31 – 42
Inner Mouth: 43 – 48

In this way, each 2D images for IntraFace has its unique 49 interest points, and the interest points can be easily matched with each other. In this way, 3D reconstruction is on the way...

I extracted interest points from IntraFace and plotted them in Matlab.



2. Start to do 3D reconstruction with Matlab

I've found online code provided by Prof. Jianxiong Xia from Princeton, which completed simple 3D reconstruction of multi-cameras. And I modified the code to our situation. I changed the SIFT feature interest point matching process into IntraFace 49 interest point matching. And I am trying to use edge detector to detect the points on the edge of human face in order to do 3D reconstruction.

However, I ran the sample images, and the running time for the images are about 20-30 seconds, which is too long for real-time facial expression recognition. So I am thinking about change it to C++ with openCV to make it faster.

Challenges

1. It's hard to choose whether we use 2D or 3D for facial expression

recognition. If we use 2D images, and just add weight to each frame, I wonder how much it may be improved compared to only 1 image. However, if we use 3D reconstruction, I am considering the reconstruction time. It will be difficult to do facial expression on time. This is the main task for me in detection part. And I have asked professors and phd students, and I have not found the exact answer...

2. Speed

Matlab code running time is too slow and I think we need to transfer the codes into openCV. And I do not know how to use openCV API, so I should learn it. It may take some time.

Team Work

Tiffany: single camera face tracking.

Jimit, Gauri: calibration, and start to use keyboard to control turtlebots

Rohit: Made a CAD for turtlebot

Plan

1. Start to learn openCV
2. Figure out if we use 2D or 3D facial expression recognition
3. Work with Tiffany on single face tracking and facial expression recognition with IntraFace with CPP